AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method of identifying endmember spectra values from a multispectral image comprising multispectral image data, where each multispectral data value is equal to a sum of mixing proportions of each endmember spectrum, said method including the steps of:

processing the multispectral image data to obtain a multidimensional simplex having a number of vertices equal to the number of endmembers, the position of each vertex representing a spectrum of one of the endmembers, wherein the processing of the data includes:

providing starting estimates of each endmember spectrum for each image data value;

estimating mixing proportions for each data value from the estimates of the spectra of all the endmembers;

estimating the spectrum of each endmember from the estimates of the mixing proportions of the spectra of all the endmembers for each image data value, and

repeating the estimation of the mixing proportions and the estimation of the spectrum of each endmember until a stopping condition is met, wherein the stopping condition occurs when a relative change in a regularized residual sum of

squares determined in the estimation steps attains a threshold,

wherein the regularized residual sum of squares comprises a sum of residual sum of squares and a measure of the size of the simplex, the residual squares is reflective of a difference between the multispectral image data and a calculated value based on the estimated mixing proportions and estimated spectrum of each endmember~~, and wherein the regularized residual sum of squares includes a term which is a measure of the size of the simplex~~.

2. (Currently Amended) A method according to claim 1, wherein the ~~term used in the regularized residual sum of squares is the~~ measure of the size of the simplex comprises a sum [[is]]of the squared distances between all of the simplex vertices.

3. (Cancelled).

4. (Cancelled).

5. (Previously Presented) A method according to claim 1, wherein the relative change in the regularized residual sum of squares is determined by calculating a ratio comprising successive values of the regularized residual sum of squares.

6. (Previously Presented) A method according to claim 5, wherein the stopping condition is met when the ratio attains 0.99999.

7. to 9. (Cancelled).

10. (Previously Presented) A method according to claim 1, wherein the step of estimating the spectrum of each endmember is conducted using a linear estimation technique.

11. (Previously Presented)) A method according to claim 1, wherein the step of estimating the mixing proportions is conducted using a quadratic minimization technique.

12. (Previously Presented) A method according to claim 1, wherein estimating the mixing proportions for each data value occurs iteratively so as to minimize a first regularized residual sum of squares, the first regularized residual sum of squares comprising a term which is a measure of the size of the simplex.

13. (Previously Presented) A method according to claim 12, wherein estimating the spectrum of each endmember occurs iteratively so as to minimize a second regularized residual sum of squares, the second regularized residual sum of squares comprising a term which is a measure of the size of the simplex.

14. (Previously Presented) A method according to claim 13, wherein the relative change in the regularized residual sum of squares is determined by calculating a ratio comprising successive values of a minimized regularized residual sum of squares, wherein the successive values of the minimized regularized residual sum of squares are minima of the second and first regularized residual sum of squares calculated for each repetition of the estimation steps.

15. (Previously Presented) A method according to claim 13, wherein the stopping condition is met when the ratio attains a tolerance value.

16. (Previously Presented) A method according to claim 1, wherein the estimated spectra of the endmembers after the stopping condition is met are regarded as the identified endmember spectra values from the multispectral image data.

17. (Previously Presented) A method according to claim 16, wherein the estimated mixing proportions of each data value after the stopping condition is met are regarded as identified proportions of each of the identified endmember spectra values present in each data value of the multispectral image data.

18. (New) A system for identifying endmember spectra values from a multispectral image comprising multispectral image data, where each multispectral data value is equal to a sum of mixing proportions of each endmember spectrum, said system comprising:

a data processor configured to process a multispectral image comprising multispectral data values so as to obtain endmember spectrum values of a

multidimensional simplex having a number of vertices equal to the number of endmembers, the position of each vertex representing a spectrum of one of the endmembers,

wherein the data processor is configured to:

provide starting estimates of each endmember spectrum for each image data value;

estimate mixing proportions for each data value from the estimates of the spectra of all the endmembers;

estimate the spectrum of each endmember from the estimates of the mixing

proportions of the spectra of all the endmembers for each image data value, and

repeat the estimation of the mixing proportions and the estimation of the spectrum of each endmember until a stopping condition is met, wherein the stopping condition occurs when a relative change in a regularized residual sum of squares determined in the estimation steps attains a threshold, wherein that the regularized residual sum of squares comprises the sum of a residual sum of squares and a measure of the size of the simplex, the residual sum of squares being reflective of a difference between the multispectral image data and a calculated value based on the estimated mixing proportions and estimated spectrum of each endmember.